Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A process for forming an underlying film, comprising: irradiating the surface of an insulating film disposed on an electronic device substrate with plasma based on a process gas comprising at least an oxygen atom-containing gas, to thereby form an underlying film at the interface between the insulating film and the electronic device substrate.

2. (Original) A process for forming an underlying film according to claim 1, wherein the insulating film is a film comprising a high-dielectric constant material.

3. (Previously Presented) A process for forming an underlying film according to claim 1, wherein the plasma is plasma containing oxygen radicals.

4. (Previously Presented) A process for forming an underlying film according to claim 1, wherein the underlying film is an oxide film.

5. (Previously Presented) A process for forming an underlying film according to claim 1, wherein the plasma is plasma based on a plane antenna member (RLSA).

6. (Withdrawn) An electronic device material, comprising:

an electronic device substrate,

an underlying film disposed on the substrate, and

an insulating film disposed on the underlying film, wherein the underlying film is a film which has been formed by supplying plasma from the insulating layer side.

7. (Withdrawn) The electronic device material according to claim 6, wherein the insulating film is a film comprising a high-dielectric constant material.

8. (New) A process for forming an insulating film, comprising:

forming an insulating film on a substrate,

converting a process gas comprising at least an oxygen atom-containing gas on the insulating film to thereby generate oxygen radicals, and

irradiating the surface of the insulating film with the oxygen radicals so that the oxygen radicals penetrate the insulating film and react with the

substrate to thereby form an oxide film at the interface between the insulating film and the substrate.

9. (New) A process for forming an insulating film according to claim 8, wherein the insulating film comprises a high-dielectric constant material.

10. (New) A process for forming an insulating film according to claim 8, wherein the insulating film comprises at least one material selected from the group consisting of Al_2O_3, ZrO2, HfO_2, Ta_2O_5, ZrSiO, HfSiO and ZrAlO.

11. (New) A process for forming an insulating film according to claim 8, wherein the process gas comprises at least one rare gas selected from the group consisting of Kr, Ar, He and Xe.

12. (New) A process for forming an insulating film according to claim 8, wherein the oxygen atom-containing gas is O_2 gas.

13. (New) A process for forming an insulating film according to claim 8, further comprising annealing the substrate after the formation of the oxide film.

14. (New) A process for forming an insulating film according to claim 13, wherein the annealing is conducted in an atmosphere of N_2, O_2, or N_2 and O_2.

15. (New) A process for forming an insulating film according to claim 13, wherein the annealing is conducted at a temperature of 500-1100°C.

16. (New) A process for forming an insulating film, comprising:

forming a high-dielectric constant insulating film on a substrate,

generating plasma based on a process gas comprising at least an oxygen atom-containing gas on the high-dielectric constant insulating film, and

irradiating the surface of the high-dielectric constant insulating film with the plasma to thereby form an oxide film at the interface between the high-dielectric constant insulating film and the substrate.

17. (New) A process for forming an insulating film according to claim 16, wherein the plasma is generated based on microwave via a plane antenna member (RLSA) having a plurality of slots.

18. (New) A process for forming an insulating film according to claim 16, wherein the high-dielectric constant insulating film comprises at least one material selected from the group consisting of Al_2O_3, ZrO_2, HfO_2, Ta_2O_5, ZrSiO, HfSiO and ZrAlO.

19. (New) A process for forming an insulating film according to claim 16, wherein the process gas comprises at least one rare gas selected from the group consisting of Kr, Ar, He and Xe.

20. (New) A process for forming an insulating film according to claim 16, wherein the oxygen atom-containing gas is O_2 gas.

21. (New) A process for forming an insulating film according to claim 16, further comprising annealing the substrate after the formation of the oxide film.

22. (New) A process for forming an insulating film according to claim 21, wherein the annealing is conducted in an atmosphere of N_2, O_2, or N_2 and O_2.

23. (New) A process for forming an insulating film according to claim 21, wherein the annealing is conducted at a temperature of 500-1100°C.

24. (New) A process for forming an insulating film according to claim 16, wherein the substrate is at a temperature from room temperature to 500°C.

25. (New) A process for forming an insulating film according to claim 16, wherein the oxide film is formed at a pressure of 3-500 Pa.

26. (New) A process for forming an insulating film according to claim 16, wherein the oxide film is a silicon oxide film having a thickness of 6-12 A.

27. (New) A process for forming an insulating film according to claim 16, wherein the plasma has an electron temperature of 0.5-2.0 eV.

28. (New) A process for forming an insulating film according to claim 16, further comprising plasma nitriding the surface of the substrate before the formation of the high-dielectric constant insulating film.

29. (New) A process for forming an insulating film, comprising:

forming a HfSiO film on a substrate,

generating plasma based on a process gas comprising at least an oxygen atom-containing gas on the HfSiO film, and

irradiating the surface of the HfSiO film with the plasma, to thereby form an oxide film at the interface between the HfSiO film and the substrate.

30. (New) A process for forming an insulating film according to claim 29, wherein the plasma is generated based on microwave via a plane antenna member (RLSA) having a plurality of slots.

31. (New) A process for forming an insulating film according to claim 29, wherein the oxygen atom-containing gas is O_2 gas and the process gas comprises at least one rare gas selected from the group consisting of Kr, Ar, He and Xe.

32. (New) A process for forming an insulating film according to claim 29, further comprising annealing the substrate after formation of the oxide film.

33. (New) A process for forming an insulating film according to claim 32, wherein the annealing is conducted in an atmosphere of N_2, O_2, or N_2 and O_2.

34. (New) A process for forming an insulating film according to claim 32, wherein the annealing is conducted at a temperature of 600-1100°C.

35. (New) A process for forming an insulating film according to claim 29, wherein the substrate is at a temperature from room temperature to 500°C.

36. (New) A process for forming an insulating film according to claim 29, wherein the oxide film is formed at a pressure of 3-500 Pa.

37. (New) A process for forming an insulating film according to claim 29, wherein the oxide film is a silicon oxide film having a thickness of 6-12 A.

38. (New) A process for forming an insulating film according to claim 29, wherein the plasma has an electron temperature of 0.5-2.0 eV.

39. (New) A process for forming an insulating film according to claim 29, further comprising plasma nitriding the surface of the substrate before the formation of the HfSiO film.

40. (New) A process for forming an insulating film according to claim 29, wherein the HfSiO film is formed by using tertiary ethoxy hafnium (HTB: $Hf(OC_2H_5)_4$) and silane gas (SiH_4).

41. (New) A process for forming an insulating film according to claim 29, further comprising washing the substrate before the formation of the HfSiO film.

42. (New) A process for forming an insulating film, comprising:

forming a HfSiO film on a substrate,

generating plasma based on a process gas comprising at least an oxygen atom-containing gas on the HfSiO film,

irradiating the surface of the HfSiO film with the plasma to thereby form an oxide film at the interface between the HfSiO film and the substrate, and

nitriding the surface of the HfSiO film.

43. (New) A process for forming an insulating film according to claim 42, further comprising plasma nitriding the surface of the substrate before the formation of the HfSiO film.

44. (New) A process for forming an insulating film according to claim 42, further comprising washing the substrate before the formation of the HfSiO film.

45. (New) A semiconductor manufacturing apparatus for forming an insulating film, said apparatus comprising:

a cassette station for disposing a substrate,

a first arm for putting in and out with respect to the cassette,

at least one plasma processing unit for plasma oxidizing or plasma nitriding the substrate, a heating unit for heating the substrate,

a heating reaction furnace for forming a high-dielectric constant film on the substrate,

a transportation chamber for disposing the plasma processing unit and the heating unit,

a second arm disposed in the transportation chamber, for transporting the substrate between the respective units, and

a load lock for conducting the communication/cutoff between the respective processing units.

46. (New) A process for forming an electronic device, comprising:

forming a high-dielectric constant gate insulating film on a substrate,

generating plasma based on a process gas comprising at least an oxygen atom-containing gas on the high-dielectric constant gate insulating film,

irradiating the surface of the high-dielectric constant gate insulating film with the plasma, to thereby form an oxide film at the interface between the high-dielectric constant gate insulating film and the substrate, and

forming a gate electrode on the high-dielectric constant gate insulating film.

47. (New) A process for forming an electronic device according to claim 46, wherein the plasma is generated based on microwave via a plane antenna member.

48. (New) A process for forming an electronic device according to claim 46, wherein the substrate is at a temperature from room temperature to 500°C.

49. (New) A process for forming an electronic device according to claim 46, wherein the oxide film is formed at a pressure of 3-500 Pa.

50. (New) A process for forming an electronic device according to claim 46, further comprising nitriding the surface of the high-dielectric constant gate insulating film after the formation of the oxide film.

51. (New) A process for forming an electronic device according to claim 46, further comprising annealing the surface of the high-dielectric constant gate insulating film after the formation of the oxide film.

52. (New) A process for forming an electronic device according to claim 46, wherein the oxide film is a silicon oxide film having a thickness of 6-12 A.

53. (New) A process for forming an electronic device according to claim 46, wherein the high-dielectric constant gate insulating film comprises at least one material selected from the group consisting of Al_2O_3, ZrO_2, HfO_2, Ta_2O_5, ZrSiO, HfSiO and ZrAlO.

54. (New) A process for forming an electronic device according to claim 46, further comprising plasma nitriding the surface of the substrate before the formation of the high-dielectric constant insulating film.

REMARKS

Claims 6-7 are withdrawn from consideration and new claims 8-54 are added. Support for new independent claims 8, 16, 29, 42 and 46 can be found at page 4, lines 2-31, page 7, lines 10-14, page 12, lines 34-37 and page 20, lines 5-27 of the specification. Support for new claims 9, 17, 30 and 47, as well as new independent claim 45, which relates to an apparatus specifically adapted for carrying out the process of the invention, can be found at page 11, line 28-page 14, line 26. Support for new claims 10-15, 18-27, 31-38 and 48-54 can be found at page 7, line 10-page 9, line 13. Support for new claims 28, 39, 43 and 54 can be found at page 18, lines 13-24. Support for new claim 40 can be found at page 18, line 30, and support for new claims 41 and 44 can be found at page 22, line 25-page 23, line 13. Claims 1-5 and 8-54 are presented for further examination.

By this amendment, the specification has been amended to correct minor typographical errors.

The rejection of claims 1-2 and 4-5 as obvious over Murakawa, JP 2000-294550 in view of Parker, US 2004/0110361, and the rejection of claim 3 as obvious over Murakawa in view of Parker and further in view of Suzuki, US 6,497,783 are respectfully traversed.

Applicants submit herewith a verified English-language translation of Japanese Patent Application No. 2002-097845, from which the above-identified

application claims priority, thereby perfecting the priority claim. A certified copy of the Japanese priority document was submitted previously.

Parker is a reference as of its filing date. However, the filing date of Parker, December 10, 2002, is after the claimed priority date of the present application, March 29, 2002. Because Parker is not properly available as a reference against the present application, reconsideration and withdrawal of the rejections are respectfully requested.

In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned at (202) 624-2995 would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #101249.55458US).

Respectfully submitted,

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